

## **ISIDIS CHARACTERIZATION FOR BEAGLE 2**

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The ESA Mars Express Mission plans to land the Beagle 2 lander in the Isidis Planitia (11 deg north, 90 deg east). Detailed characterization of this site has been made possible by the Mars Global Surveyor (MGS) Mars Orbiter Laser Altimeter (MOLA) high spatial and topographic resolution dataset. In the Isidis area of interest for Beagle 2, over 500,000 MOLA points exist providing: Absolute radii (digital topography model- DTM) and elevations (digital elevation model – DEM) having precisions at the meter level; Slope statistics (mean, standard deviation, min, max, probabilities, etc.) having precisions at the 0.001 deg level; Absolute cartographic coordinates having precisions at the few meter level; and a digital image model (DIM) by illuminating the DEM. These data are required for targeting the landing, determining the flight path through the atmosphere and assessing landing hazards. MOLA also provides surface albedo and roughness data. Registering and map projecting higher spatial resolution imaging from Viking and MGS MOC to the MOLA surface provides additional dimensions to the Isidis characterization dataset

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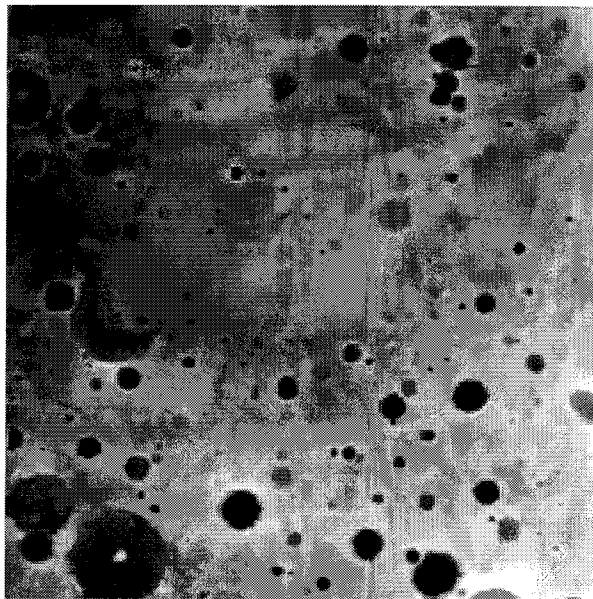
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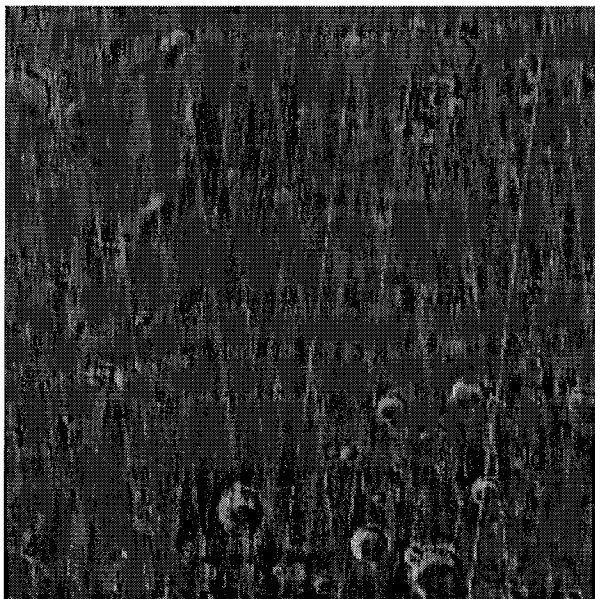
**ISIDIS LANDING SITE CHARACTERIZATION.** T. C. Duxbury, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 91109, [tduxbury@jpl.nasa.gov](mailto:tduxbury@jpl.nasa.gov)

The Mars Global Surveyor (MGS) Mars Orbiter Laser Altimeter (MOLA) data provide the basis for site characterization and selection never before possible. The basic MOLA information includes absolute radii, elevation and 1  $\mu\text{m}$  albedo with derived datasets including digital image models (DIM's – illuminated elevation data), slopes maps and slope statistics and small scale surface roughness maps and statistics. These quantities are useful in downsizing potential sites from descent engineering constraints and landing / roving hazard and mobility assessments. Slope baselines at the few hundred meter level and surface roughness at the 10 meter level are possible.

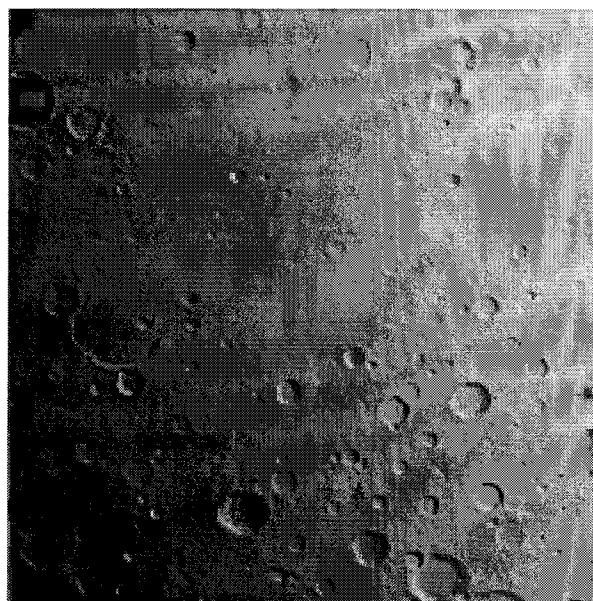
Additionally, the MOLA-derived Mars surface offers the possibility to precisely register and map project other instrument datasets (images, ultraviolet, infrared, radar, etc.) taken at different resolution, viewing and lighting geometry, building multiple layers of an information cube for site characterization and selection. Examples of direct MOLA data, data derived from MOLA and other instruments data registered to MOLA are given for the Hematite area.



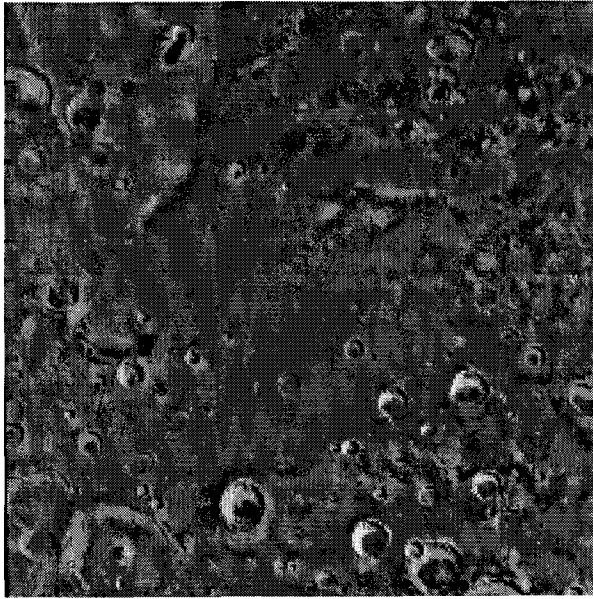
MOLA digital elevation model (DEM) in the Isidis area (~1.3 M MOLA points)



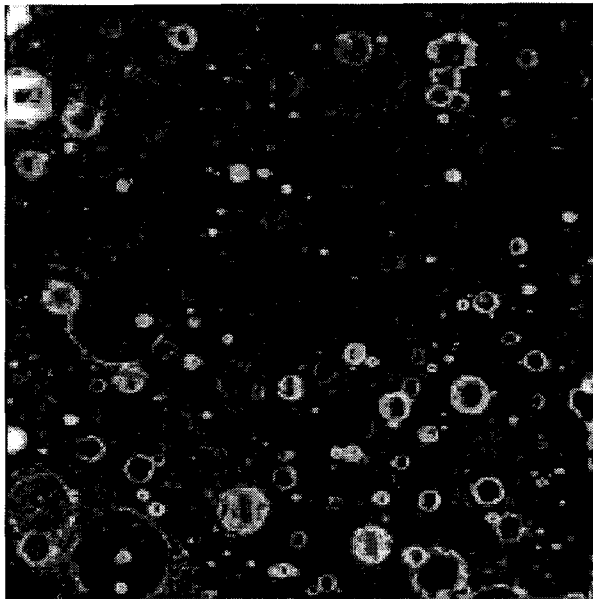
MOLA coverage in the Isidis area (~750 orbits)



Derived digital image model (DIM) in the Isidis area produced by illuminating the MOLA DEM

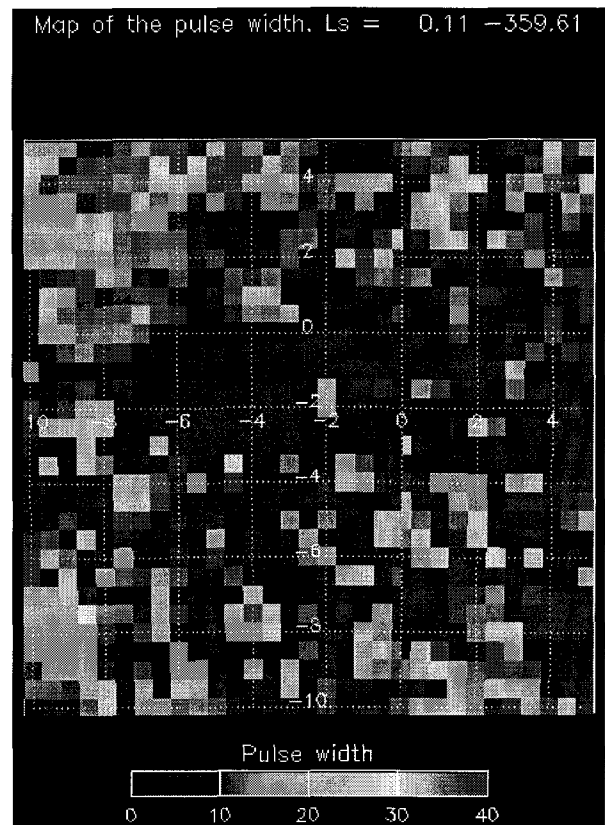


Map-projected and gridded Viking Orbiter imaging data registered to the MOLA reference surface and coordinates



MOLA-derived Isidis area slope map

Acknowledgement: this work would not be possible without the success of the MGS MOLA instrument provided by Dr. David Smith, Goddard Space Flight Center and the MOLA team. This work was conducted at the Jet Propulsion Laboratory, California Institute of Technology, under contract to the National Aeronautics and Space Administration, Mars Data Analysis Program.



Such pulse width maps combined with the slope map information on the left can be used to compute surface roughness